Space Weather Forecast

Issued on Wednesday, 04 September 2024 at 12:32 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Ongoing but waning chance of G1/Minor Geomagnetic Storm interval Day 1 (04 Sep). Moderate flares expected, slight chance of Strong flares. Chance of S1/Minor Radiation Storms through the period.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity was Moderate in the past 24hrs, with several Moderate flares. The strongest was from a large and complex region in the southeast quadrant. There are currently twelve sunspot regions on the visible disc, three of which are sufficiently large and complex enough to be of interest for the forecast period. The largest region on the disc is approaching the southwest limb but maintains its magnetic complexity in the central portion. A region near south centre disc has numerous spots, and has also developed areas of magnetic complexity. The region in the southeast quadrant, responsible for much of the Moderate flare activity, appears to be large and complex region, but due to foreshortening it remains difficult to distinguish the exact magnetic configuration. This region is showing significant looping in imagery, however, and may be magnetically connected to another region close to the southeast limb. All other regions are relatively simple and stable at present.
A weak Coronal Mass Ejection (CME) was observed off the northeast limb around 03/2030 UTC and is not estimated nor modelled by Enlil to be Earth-directed.

Solar Wind / Geomagnetic Activity: Solar wind parameters as measured by DSCOVR at L1 were indicative of a return to a slow regime. The solar winds sharply increased from 330 km/s to slightly elevated levels of around 410 km/s at 04/0937 UTC, which is likely to be the arrival of a shock from the CME that left the Sun on 01 Sep. The Interplanetary Magnetic Field was mostly moderate but increased to strong around 04/0940 UTC. The important the north-south component, Bz, continued to fluctuate weakly and has remained largely positive before fluctuating more strongly after 04/0800 UTC. Resulting geomagnetic activity was Quiet (Kp 1-2) but with an Active (Kp 4) interval 0900-1200 UTC following the glancing blow from the aforementioned CME shock.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has risen in response to a flare on 01 Sep, but remains below the S1/Minor Radiation Storm level.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is expected with a slight chance of isolated Strong flares. The main flare risk is currently from any of the three larger sunspot regions in the southern hemisphere.

Solar Wind / Geomagnetic Activity: The recent uptick in geomagnetic activity and solar wind speeds has been attributed to glancing effects from a large CME off the southeast limb on 01 Sep, the bulk of which is expected to pass well behind Earth's orbit. Two coronal holes may influence wind speeds later in the forecast, with connection to a stream of strong solar winds possible (450-500 km/s) on Day 4 (07 Sep).

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Met Office Space Weather Forecast

Mainly Quiet to Unsettled (Kp 1-3) activity is expected with a chance of Active (Kp 4) intervals on Day 4 and a slight but waning chance of G1/Minor Storm intervals (Kp 5) on Day 1 following the recent glance from a CME shock.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is currently above background levels, but below the S1/Minor Radiation Storm threshold. There is a chance of exceeding S1 in the coming days.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	80	70	70
Very Active	R3 to R5 X	No	25	25	20	20

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Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	30	25	25	25
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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